iSENSE
by VEXVE

Smart monitoring solutions for district energy networks

Vexve iSENSE™ smart monitoring solutions

Vexve's iSENSE product family consists of smart monitoring solutions designed for underground district heating and cooling networks. The real-time measurement data provided by iSENSE product family helps to improve network efficiency, provides tools for condition monitoring and enables fast leakage detection.

The iSENSE product family consists of four different products: iSENSE Flow, iSENSE Opti, ISENSE Pulse and iSENSE Chamber. All iSENSE products are self-powered, suitable for wireless underground use and can be retrofitted to existing networks.

Monitoring systems are delivered on a turnkey basis. Vexve's maintenance service takes care of system functionality and device maintenance.

SAFETY

Avoid unnecessary chamber visits with continuous remote monitoring.

PREVENTIVE MAINTENANCE

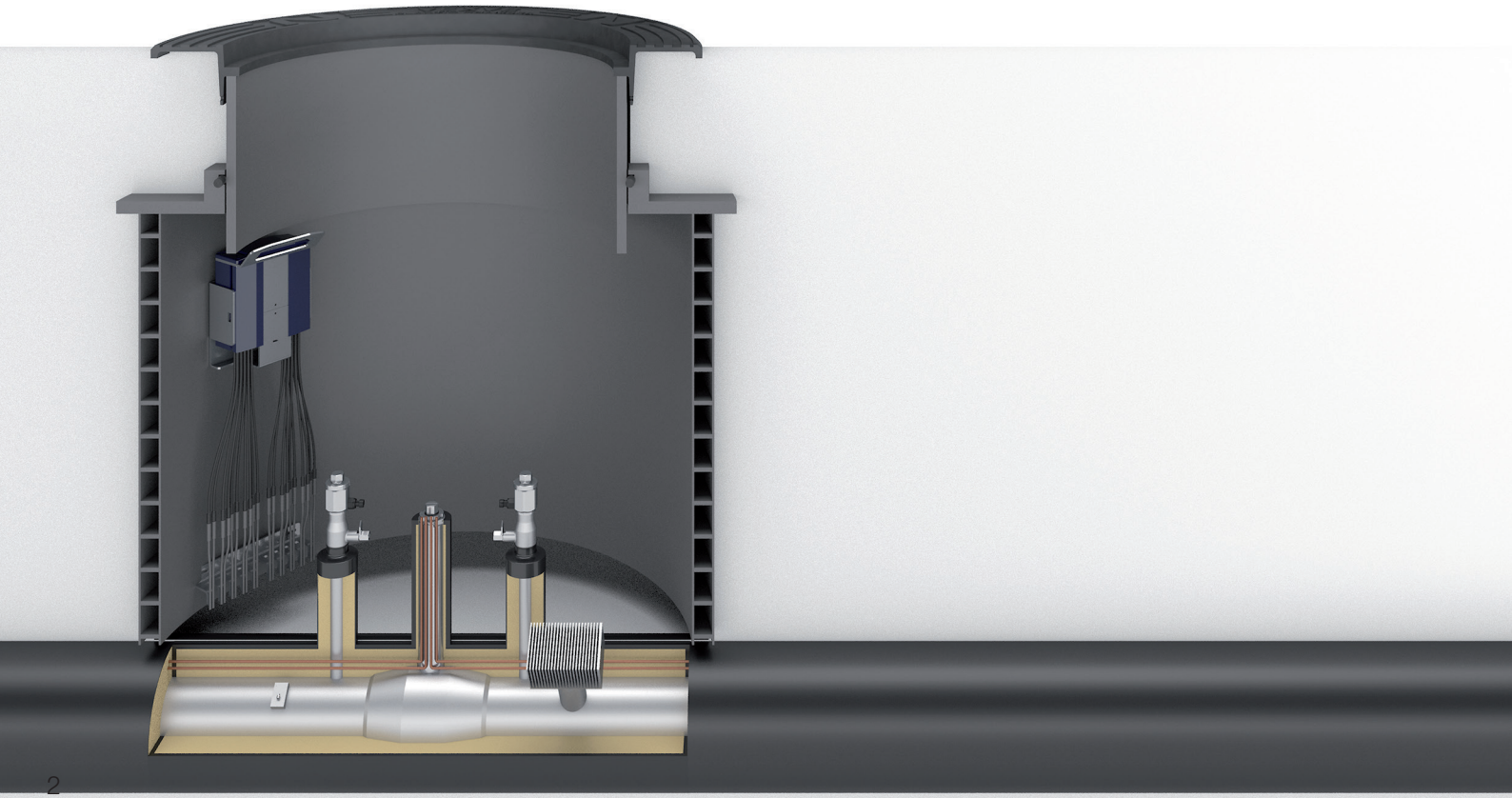
Monitor underground network and prevent possible damages in your network.

CUSTOMER SATISFACTION

Minimize customer disruptions. Locate problem situations fast.

COST-EFFICIENCY

Keep customers happy with optimized energy production. Improve your network efficiency and achieve cost savings.



Vexve iSENSE™ features

Online monitoring

Real-time monitoring of iSENSE solutions is done through the iSENSE Online cloud service. **iSENSE Online** is a visual and easy-to-use interface for up-to-date monitoring of measured data.

Data is sent to cloud service every 15 minutes, every hour or once a day, depending on your iSENSE device. The data can be seen with accurate dots and visual charts on the map. Cloud service is available from all devices, anytime, anywhere, with SSL-protected login.

Wireless data transmission

iSENSE smart monitoring product family uses the **LoRaWAN data transmission network**. For low network coverage areas, the network can be extended with the LoRaWAN base station.

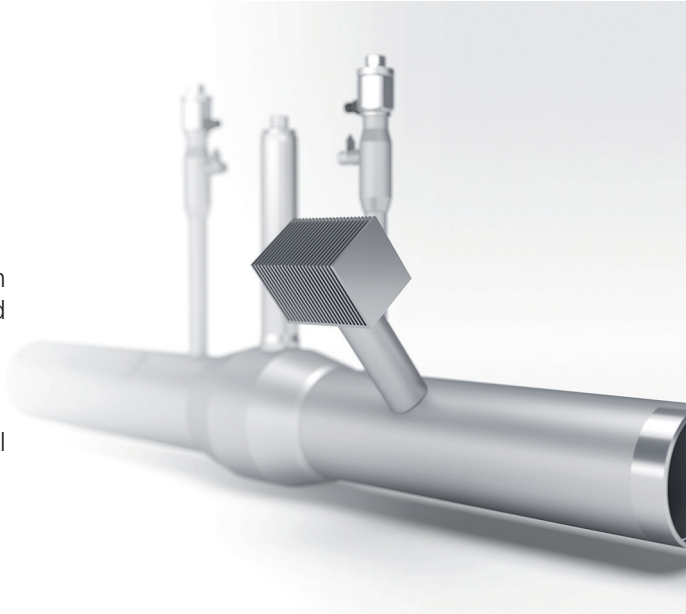
Benefits of using LoRaWAN in district energy network applications:

- wireless
- energy efficient
- good underground operation
- possibility of two-way communication
- easy deployment in LoRaWAN coverage area

Self-powered power generation

iSENSE products can be equipped with **iSENSE Power thermoelectric generator.**

- Energy is produced locally using the temperature difference between the district heating supply pipe and chamber ambient (required temperature difference min. 25°C).
- One generator can power both supply and return line metering.
- If the required temperature difference is not reached (eg. seasonal variation), the equipment will temporarily use batteries.
- Suitable for iSENSE Opti and Pulse products.



iSENSE Flow

For measuring changing flow and network conditions

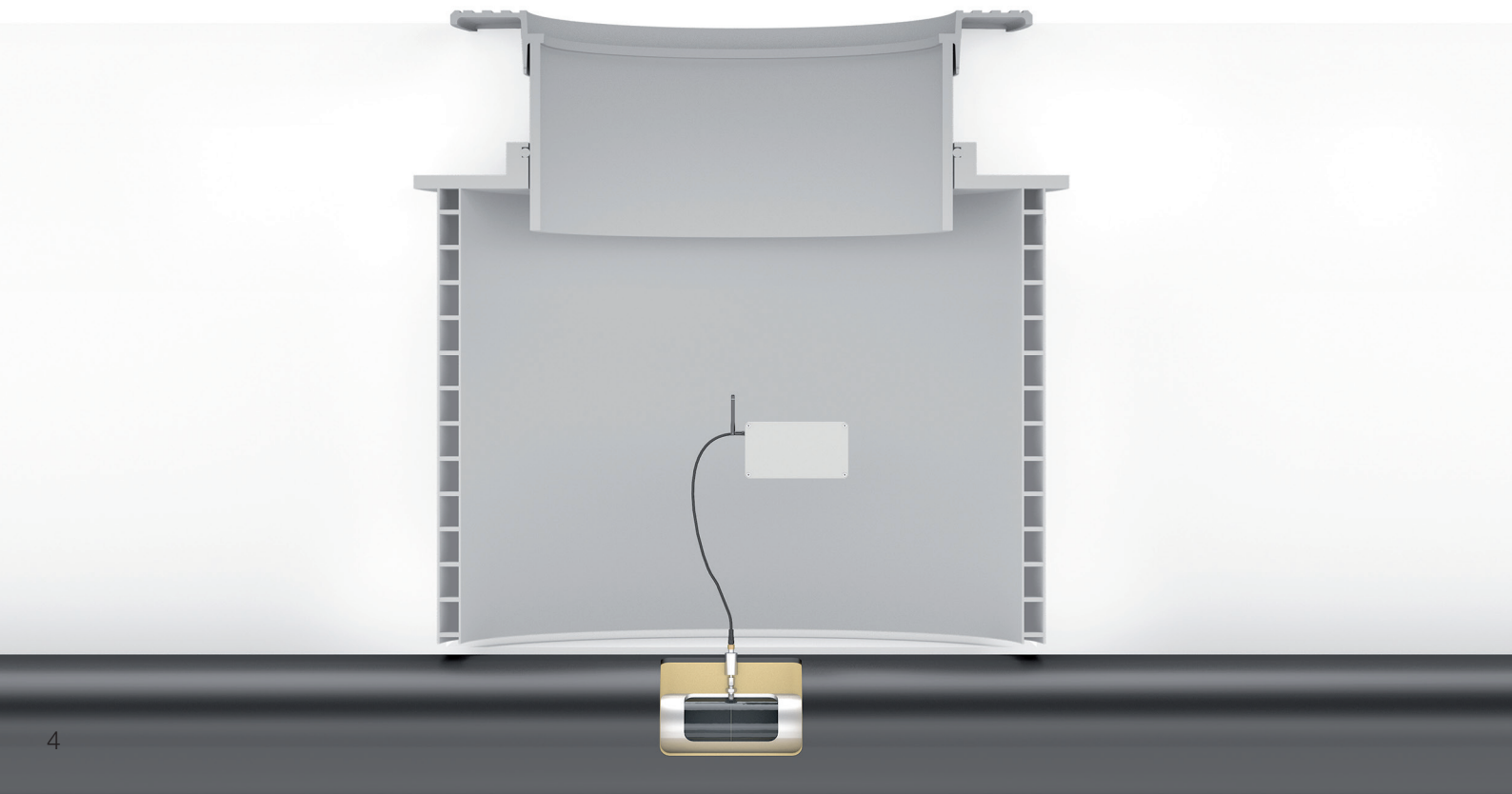
iSENSE Flow is a wireless monitoring solution for measuring changing flow and network conditions. The measurement data produced by iSENSE Flow supports energy companies in network optimization, regional heat consumption monitoring, and computational models validation.

Including flow and temperature measurement:

- suitable for detecting changing flow trends
- the flow measurement is based on a calorimetric sensor that measures the flow rate
- sensor max. temperature 125°C
- measurement range: 0–400 cm/s
- volumetric flow rate is determined by the flow rate and surface area
- sensor accuracy 2% in laminar flow
- temperature measurement range: -25–125°C

iSENSE Flow measuring device:

- one equipment to collect and transfer all the measured data
- sends information to iSENSE Online cloud service every 15 minutes
- includes wireless LoRaWAN transmitter and external antenna
- durable and easy attachment to the wall of the chamber with DIN rail
- designed for demanding underground conditions
- ambient temperature range: -20 to +50°C
- IP rating: IP67
- power supply: batteries 8 pcs D 3,6 V
- device dimensions:160 x 240 x 90 mm



iSENSE Chamber

For secure remote monitoring of district energy chambers

iSENSE Chamber enables effective online monitoring of chambers. Problems caused by water accumulation in chambers can be prevented and maintenance operations can be targeted efficiently.

Measuring

Relative humidity

- measuring range: 0–100%
- accuracy: ± 2% @ 10–90%, ± 4 % @ < 10 / > 90%
- ambient temperature: -40 – +125°C

Chamber temperature

- measuring range: -40 – +125°C
- accuracy: ± 0.2°C @ 0–65°C, ± 0.6°C @ <0°C / >65°C
- ambient temperature: -40 – + 125°C

Chamber water level

- mount at desired height
- radar measurement

iSENSE Chamber device

- one equipment to collect and transfer all the measured data
- sends information to iSENSE Online cloud service every hour
- includes wireless LoRaWAN transmitter and external antenna
- durable and easy attachment to the wall of the chamber with DIN rail
- designed for demanding underground conditions
- ambient temperature range: -20 to +50°C
- IP rating: IP68
- power supply: batteries 5 pcs AA 3,6 V
- device dimensions:120 x 80 x 85 mm

iSENSE Pulse

For online leakage detection

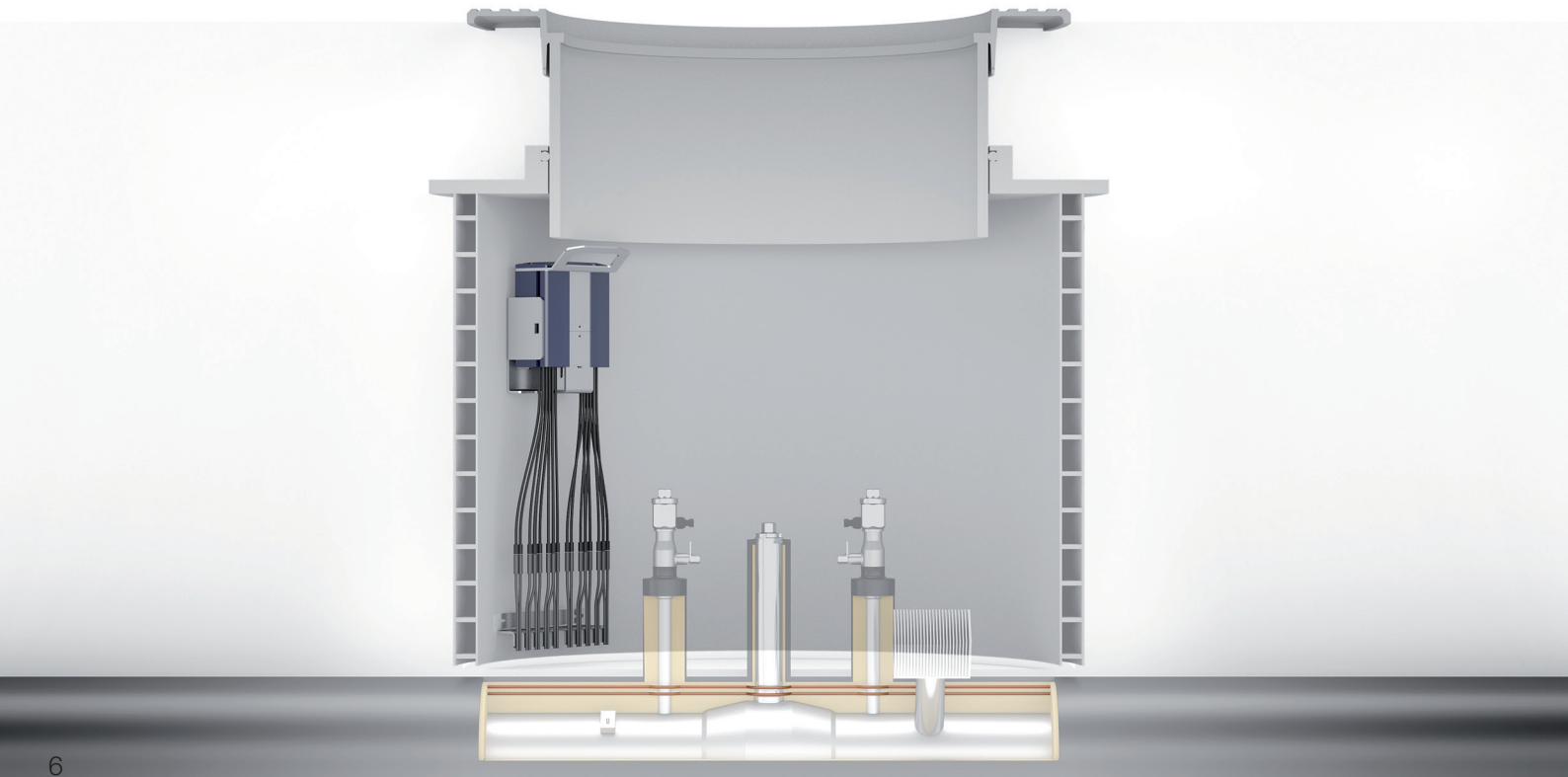
With iSENSE Pulse you can locate pipeline leakage in real-time and prevent corrosion due to insulation damage. Leakage detection is based on pulse measurement technology, which is implemented by internal insulation alarm wires.

Measuring

- the measurement can detect pipeline leakage and moisture from insulation damage
- leakage is detectable at 3 500 meters from the measuring point in both directions (alarm wire loop up to 7000 meters)
- leakage can be located with an accuracy of less than 1% of the total length of the loop
- the pipeline needs to have alarm wires inside the insulation
- type of alarm wire: Nordic
- the material of alarm wire: Copper
- number of connections: standard 2 measuring directions, 4 measuring directions possible
- measurement technology: Pulse

iSENSE Smart Unit:

- one equipment to collect and transfer all the measured data
- sends information to iSENSE Online cloud service once a day
- includes wireless LoRaWAN transmitter
- durable and easy attachment to the wall of the chamber
- separate comb for collecting extra cable
- designed for demanding underground conditions
- ambient temperature range: -20 to +50°C
- IP rating: IP68
- power supply options: iSENSE Power thermoelectric generator or alkaline batteries 12 pcs C 1.5V
- device dimensions: 210 x 200 x 95 mm
- iSENSE Opti measurements (network temperature, pressure, vibration) and iSENSE Chamber module (chamber humidity and temperature, alarm from the water surface) can be connected to the same device



iSENSE Opti

For real-time network monitoring

iSENSE Opti enables real-time detection of changing conditions in the underground district energy networks so that the network can be controlled optimally based on accurate and measured data. This measured data also helps in detecting areas with exceptionally high heat loss, as well as areas that are cooled down due to unfavorable flow direction.

Measuring

Pressure measurement before and after the valve closing element

- measuring range: 0–35 bar
- accuracy ±0,25% FSS (of the whole measured area)
- ambient temperature range: -40 to +125°C
- IP69K

Medium temperature

- measuring range: -40 to +150°C
- accuracy: ±1–2% (25°C)
- ambient temperature range: -40 to +150°C

Vibration (external or internal forces applied to the pipe)

- measuring range: ± 8 g
- ambient temperature range: -40 to +80°C

iSENSE Smart Unit:

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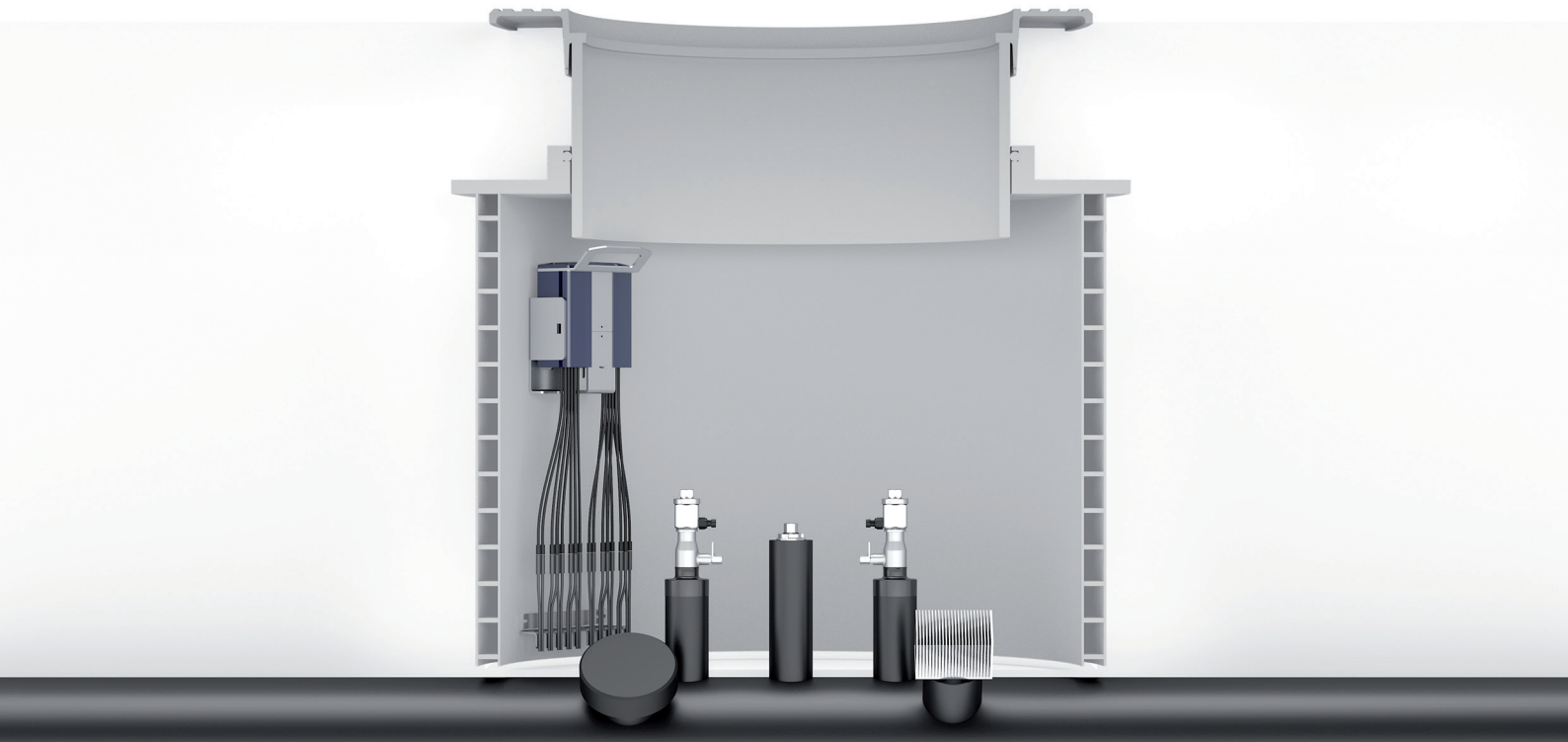

INSPIRED BY YOUR FLOW

Vexve is a globally leading supplier of valve solutions for heating and cooling needs in urban and industrial environments. Developed for demanding applications, Vexve's valve and control products together with its hydraulic control solutions are used in district energy networks and power plants in addition to the heating and cooling systems of all sizes of buildings.

Our vision is to be a committed and responsible technology partner for heating and cooling. Together we can create innovative and efficient energy infrastructures that support the sustainable development of the modern smart city.

Vexve is a part of Vexve Armatury Group, which is the leading European provider of valve solutions for the energy sector.

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